

# C2PC Measures of Effectiveness (MOE) Version 2.0



The Titan Corporation, Tactical  
Services Division  
(757) 671-2554  
cb.brown@titan.com

# Objective

- Develop an injector that provides the Commander an “actionable” sitmap in C2PC by monitoring and alerting on key events during the execution of his battle plan.
  - Focus on improved unit reporting via the C4I architecture.
  - Focus on increased use of C2PC
  - Focus on maintaining the CTP
  - Focus on the timeliness of the CTP
  - Focus on the accuracy of the CTP
  - Focus on the completeness of the CTP

**Increase the Commander's confidence in the C2PC CTP.**

# The MOE Task

- Measure of Effectiveness (MOE) injector for C2PC.
- Monitoring Agents/Knowledge Management rule sets for monitoring the execution of the battle plan using C2PC application.
- Make C2PC more useful for MAGTF Commanders and his battlestaffs/action officers!
- Active CTP graphics alert for critical events and decision points across the battlefield.
- Maximize C2PC API and current injector features

**Commander's tool for monitoring the battlespace will inherently increase the use of C2PC**

# C2PC MOE Feature Set

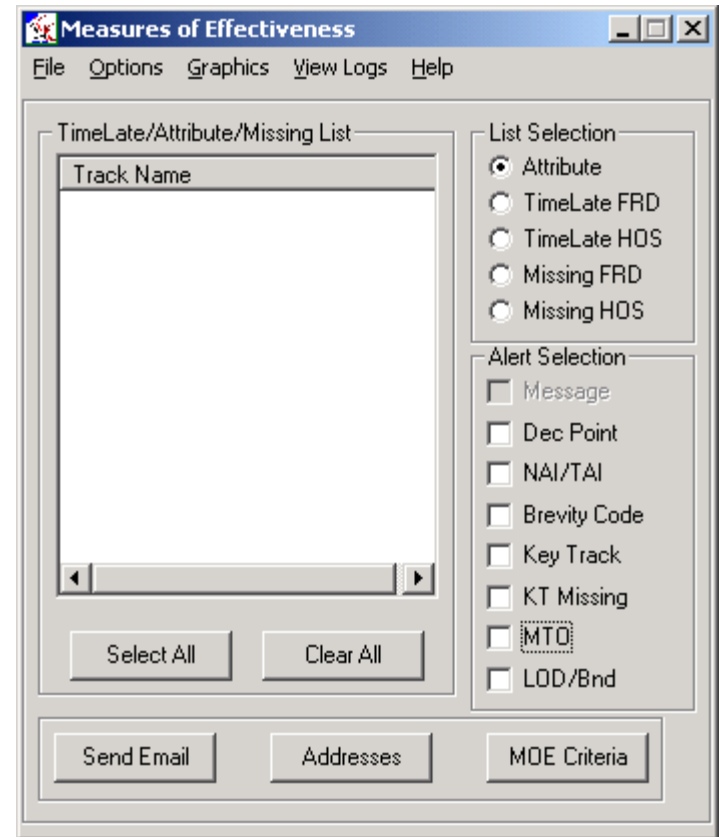
- NAI/DP/LD Alerts
- Track Attribute Agent
- Duplicate Track Agent
- Missing Tracks Agent
- Brevity Code Agent
- Key Track Agent
- Movement to Objective
- C2PC Network Status
- Alert Logs

# C2PC MOE Development

- V1
  - Currently on IOW 3.6
  - Stand alone application outside C2PC
  - Access via C2PC Measures of Effectiveness menu in C2PC Menu Group
  - Designed for C2PC 5.8.2 but works with C2PC 5.9.0.3
- V2
  - Projected for IOW 3.6.5
  - Fully embedded C2PC Injector
  - Greatly enhanced
  - Designed for C2PC 5.9.0.3

# C2PC MOE V1 Application

- Abstract Requirements/Capabilities
  - Develop a simple User Interface for allowing the Watch Officer/Chief to select when and which “rules” to activate.
  - Passively monitor the C2PC databases for the critical events to happen and report those events as they occur.
  - Allow independent views and rules for each action officer.
  - Look at what is “NOT” there as well as what is there.
  - Monitor your CTP network.
  - Develop “active” graphical objects to monitor the battlespace for events.

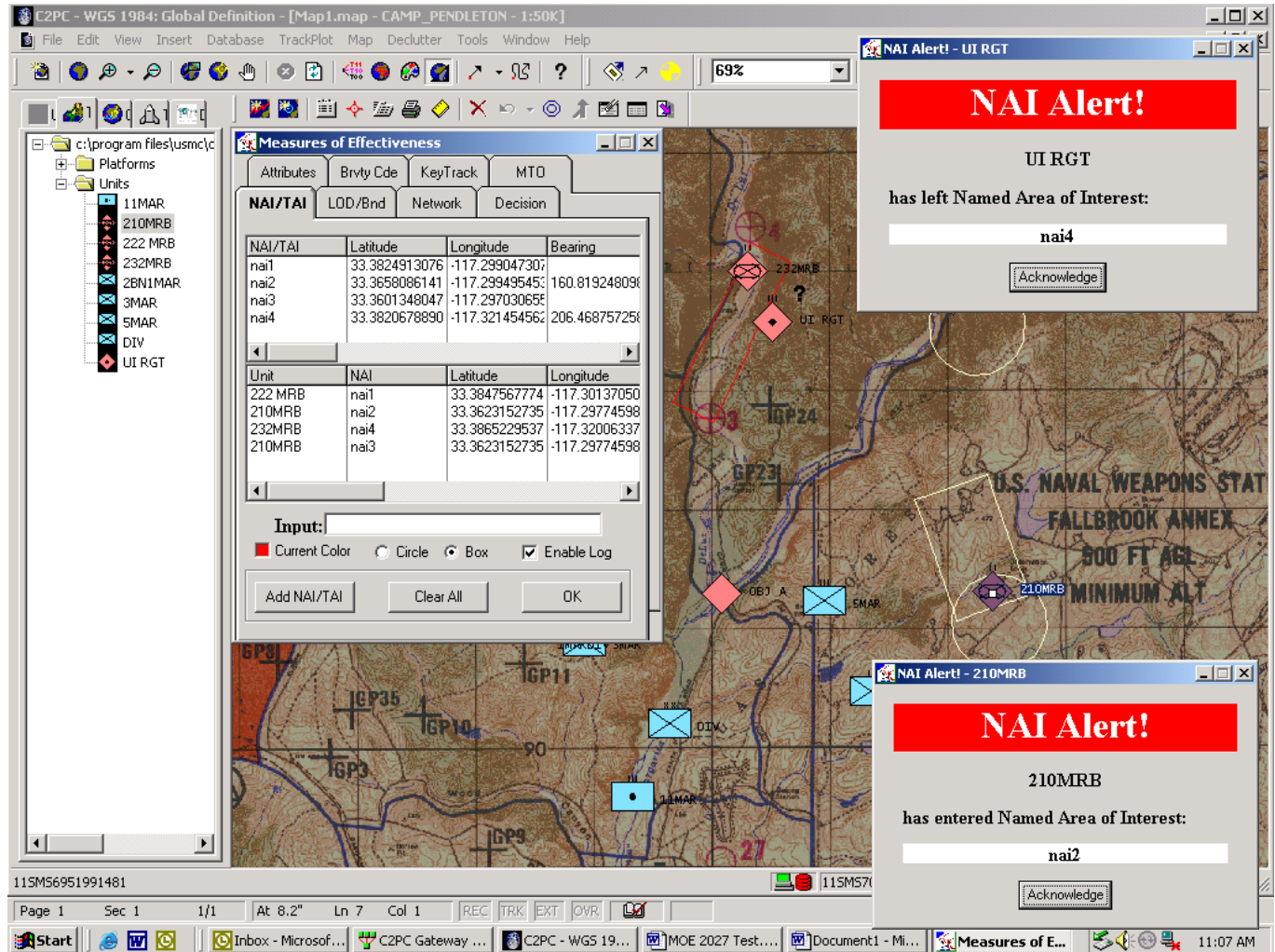


# NAI/TAI Agent

**NAI/TAI - Named Areas of Interest/Target Area of Interest - is a simple utility that the S-2 can use to monitor a NAI/TAI for enemy activity.**

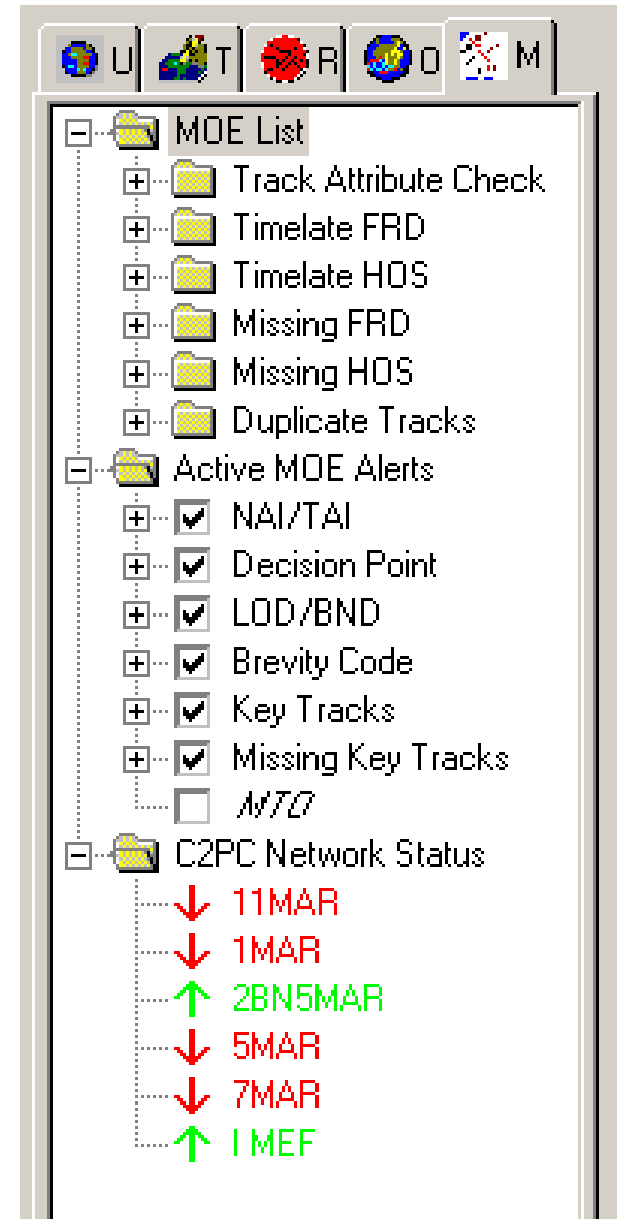
**You can choose the desired color and shape (circle or box) for the NAI/TAI. MOE monitors for any HOS/SUS unit breaching or leaving the geometry of the NAI/TAI.**

**NAI/TAI uses pop-up dialogs and, if desired, sound to alert events.**



# C2PC MOE V2 Injector

- Requirements/Capabilities
  - Develop a simple User Interface for allowing the Watch Officer/Chief to select when and which “rules” to activate.
  - Passively monitor the C2PC databases for the critical events to happen and report those events as they occur.
  - Allow independent views and rules for each action officer.
  - Assess what is “NOT” there as well as what is there.
  - Evaluate beyond “operator’s current map view”
  - Monitor CTP reporting network.
  - Develop “active” graphical objects to monitor the battlespace for events.
  - Implement easy methods for enabling and disabling alert pop-ups.





# TimeLate and Attribute Agent

Action Officers can specify Timelate and attribute reporting criteria.

MOE “watches” the database and reports which FRIENDLY and HOSTILE unit tracks are too old and which friendly units are not reporting the desired data.

When updated, the tracks will automatically be removed from the list.

Ideally, these lists would be empty which means all the tracks are reporting the right data and are up to date.

The screenshot displays the C2PC - WGS 1984: Global Definition software interface. The main window shows a map with various unit tracks. A 'MOE List' panel on the left lists tracks categorized by status and age. A 'Track Attributes' dialog box is open, showing reporting criteria. Three colored callouts explain the status of the tracks:

- Yellow callout:** These tracks are NOT reporting their combat effectiveness. (Points to tracks 1BN7MAR, 3BN7MAR, TF BRAVO, 1LARBN, MAG 39, TF33 in the 'Track Attribute Check' category.)
- Cyan callout:** These friendly tracks are more than 10 minutes old. (Points to tracks 1BN7MAR, TF BRAVO, TF22, 1BN5MAR, 1LARBN, TF33 in the 'Timelate FRD' category.)
- Red callout:** These hostile tracks are more than 20 minutes old. (Points to tracks 1BN7MAR, TF BRAVO in the 'Timelate HOS' category.)

The 'Track Attributes' dialog box shows the following settings:

- ☐ Flag
- ☐ Equipment Type
- ☐ Course
- ☐ Higher Formation
- ☐ Quantity
- ☐ Speed
- ☐ Eval Rating
- ☐ UIC
- ☒ Combat Effectiveness

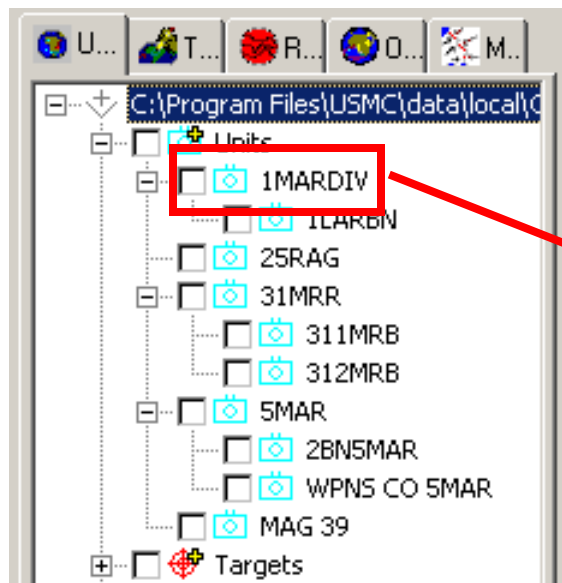
TimeLate Reporting Period (minutes):

- Friendly: 10
- Hostile: 20

Buttons: Select All, Clear All, OK

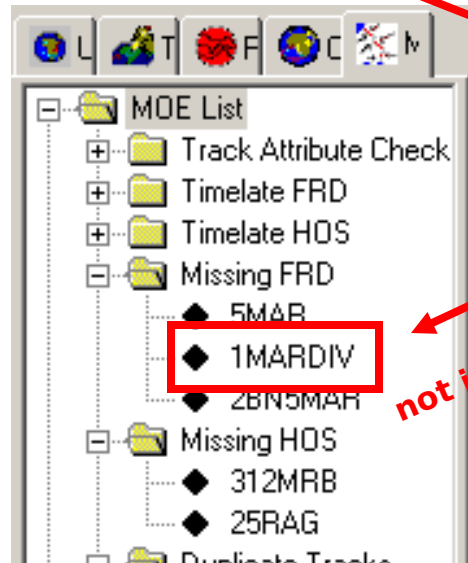
Taskbar: Start, \\192.168.1.100\share, C:\Program Files, C2PC - WGS 1984: ..., MOE InstallShield Test..., Track Attributes, 5:01 PM

# Missing Tracks Agent

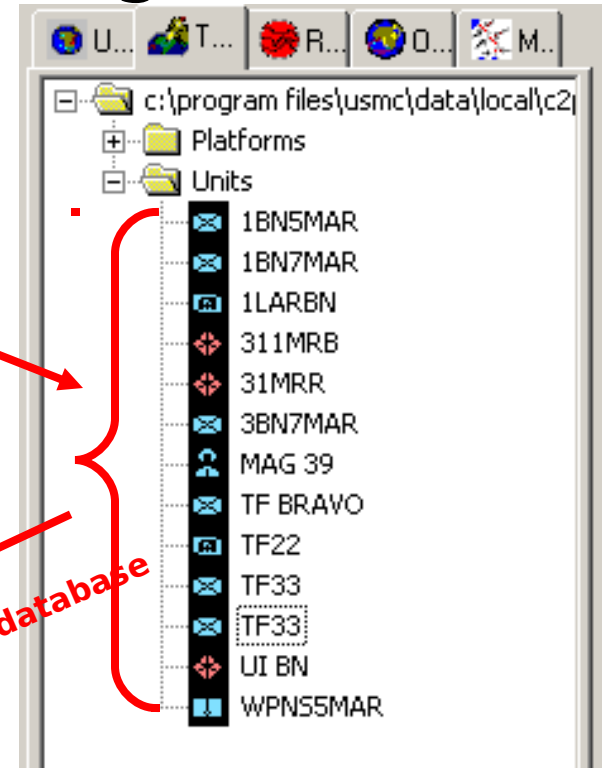


Units Injector – Planned MAGTF Organization

**The current CTP is continuously checked against the pre-planned “Units” database for the MAGTF organization and Threat OOB.**

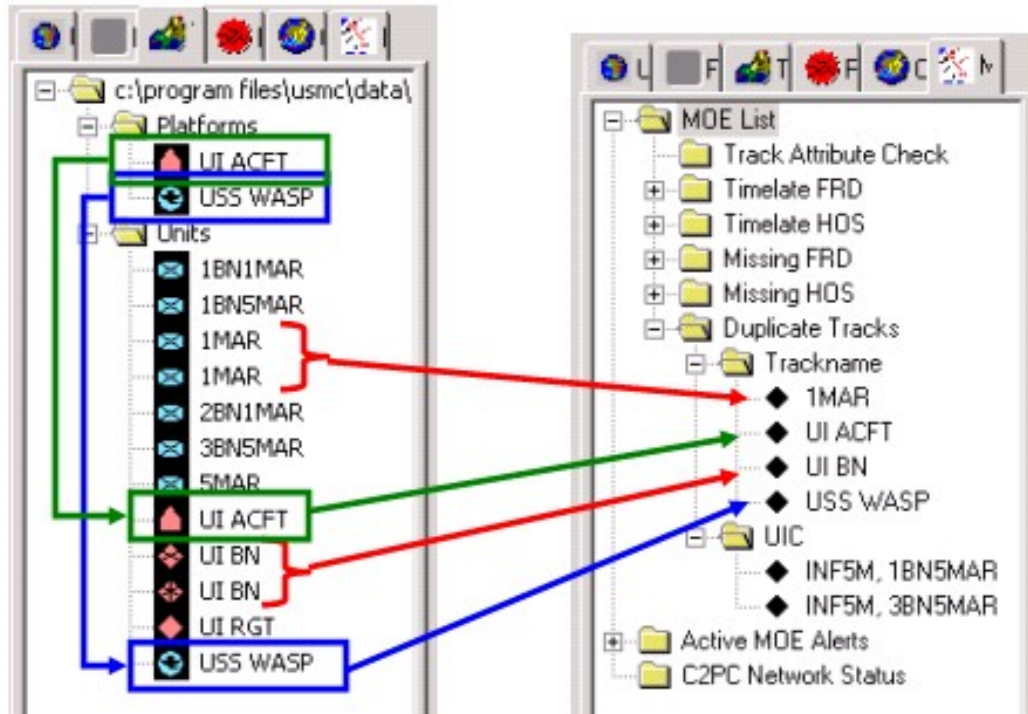


**Missing Track agent identifies FRIENDLY and Hostile tracks that are NOT in the current track database.**

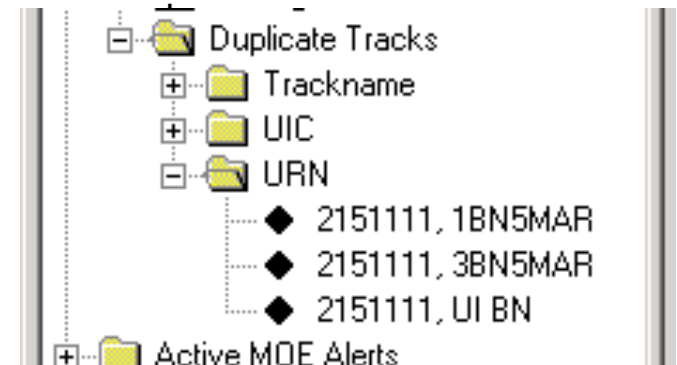
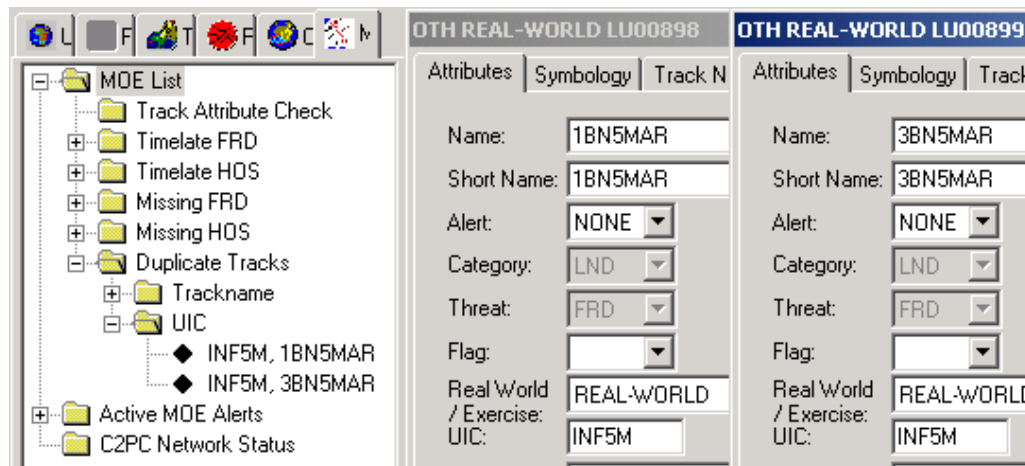


**TrackPlot Injector – shows units currently in the CTP**

# Duplicate Tracks Agent



Duplicate Tracks Agent monitors the unit track database and lists units that have the same track name (long name), Unit Identification Code (UIC) and/or the same Unit Reference Number (URN). In these example, several unit and platform tracks have duplicate names. Unless you are constantly monitoring the track lists in the TrackPlot Injector, then you would not easily detect the discrepancies. Similarly, you would have to view the properties of each track to detect duplicate UIC and or URN entries. These C2PC MOE features aid in ensuring the track reporting is





# NAI/TAI Agent

NAI/TAI - Named Areas of Interest / Target Area of Interest - is a simple utility that the S-2 can use to monitor a NAI/TAI for hostile track activity.

Use C2PC Overlays (circle, rectangle or box) for the NAI/TAI. MOE monitors for any HOS/SUS unit tracks breaching or leaving the geometry of the NAI/TAI.

NAI/TAI uses pop-up dialogs and, if desired, sound to alert events.

Each NAI/TAI alert is recorded in a history log.

The screenshot displays the NAI/TAI Agent software interface. The main window shows a map with several Named Areas of Interest (NAI) defined by different geometries: a green rectangle (NAI 1), a blue circle (NAI 2), and a red polygon (NAI 3). A pop-up dialog titled "NAI Alert! - 311MRB" is displayed, indicating that unit 311MRB has entered NAI 3. Another pop-up dialog titled "NAI Alert! - UI BN" is displayed, indicating that unit UI BN has left NAI 1. A third window titled "Overlay Files & Segments" shows a list of overlay files and segments, including COA1.mgc, IOV5903P1.mgc, and various geometric shapes like Box1, Circle1, and Rectangle1. A fourth window titled "NAI/TAI" displays a table of NAI/TAI data, including Unit, NAI, Latitude, Longitude, TimeOfReport, Bearing, and Radius.

**NAI Alert! - 311MRB**

311MRB  
has entered Named Area of Interest:  
COA1.NAI 3  
[Acknowledge]

**NAI Alert! - UI BN**

UI BN  
has left Named Area of Interest:  
COA1.NAI 1

**Overlay Files & Segments**

Overlay Files

- COA1.mgc
  - NAI 1
  - NAI 2
  - NAI 3
- IOV5903P1.mgc
  - Box1
  - Circle1
  - Rectangle1

**NAI/TAI**

Unit	NAI	Latitude	Longitude	TimeOfReport
311MRB	COA1.NAI 3	33.4381376116	-117.388223247	030349:50Z Aug 03

NAI/TAI	Latitude	Longitude	Bearing	Radius	Le
COA1.NAI 1	33.3786111111	-117.315	118		4
COA1.NAI 3	33.4586111111	-117.403333333			
COA1.NAI 2	33.3894444444	-117.422777777		1.241901	

[Add NAI/TAI] [Clear All] [OK] [Enable Log]

# DP Agent

DP - Decision Point - is a simple utility that the S-2/3 can use to create and monitor a DP for any friendly or hostile unit(s) to trip. When tripped, an alert with an associated DP "actions" file can be displayed.

DP uses the C2PC Overlay Tactical Point Decision Point, but operators can add a radius to expand the DP "trip" boundary. Any type of file or URL may be associated with the DP to provide actions to take when the DP is tripped.

Each DP trip event is recorded in a history log.

The screenshot displays the DP Agent interface, which includes a tactical map and several windows:

- MOE List:** A tree view on the left showing various mission elements like "Track Attribute Check", "Timelate FRD", "Missing FRD", "Duplicate Tracks", "Active MOE Alerts", "NAI/TAI", "Decision Point", "DPA", "DP B", "LOD/END", "Brevity Code", "Key Tracks", "Missing Key Tracks", "MTD", and "C2PC Network Status".
- Decision Point Alert! - 3BN7MAR:** A modal window with a blue header. It states "3BN7MAR has entered a Decision Point: COA1.DP A". It has "Acknowledge" and "Actions File" buttons. A blue arrow points from the "Actions File" button to the "DP1actions.txt - Notepad" window.
- DP1actions.txt - Notepad:** A text editor window showing the actions for DP 1. The text reads: "Take the following actions when DP 1 is tripped. 5MAR will establish a blocking force vic 11SM56668589620 11MAR will engage en unit at firing points GP3, GP14 and GP35 etc."
- Decision Point Alert! - 31MRR:** A modal window with a red header. It states "31MRR has entered a Decision Point: COA1.DP B". It has "Acknowledge" and "Actions File" buttons. A red arrow points from the "Actions File" button to the "DP Action File can be a web page or site" text box.
- DP Action File can be any MS Windows/Office file.** A light blue text box with a blue arrow pointing from the "Actions File" button of the 3BN7MAR alert to the Notepad window.
- DP Action File can be a web page or site.** A light red text box with a red arrow pointing from the "Actions File" button of the 31MRR alert to the text box.
- Map:** A tactical map showing various units, decision points (marked with diamonds), and boundaries. Labels include "NAI 1", "NAI 2", "NAI 3", "OP B", "31MRR", "31MRB", "UT BN", "PL LOA canary", "TF33", "WPN5MAR", and "H+6 Course of Action".



# LOD/Bnd Agent

LD/Bnd - Line of Departure/Boundary - is a MOE agent the S-3 uses to assign and monitor when a specified friendly unit(s) crosses a specific line of departure, phase line or limit of advance.

LD uses the C2PC Overlay Tactical Line graphics for LD, LD/LC, LOA and PL. As units cross a designated control measure that mission is alerted and removed from the left panel folder.

Each LD alert is recorded in a history log.

The screenshot displays the LOD/Bnd Agent interface, which includes a map, a list of units, and an alert dialog.

**MOE List**

- Track Attribute Check
- Timelate FRD
- Timelate HQS
- Missing FRD
- Missing HQS
- Duplicate Tracks
- Active MOE Alerts
  - ☒ NAI/TAI
  - ☒ Decision Point
  - ☒ LOD/BND
    - ☒ LD Green
      - ☒ TF22
      - ☒ WPNS5MAR
    - ☒ LD Purple
      - ☒ 1BN5MAR
      - ☒ TF33
    - ☒ LOA canary
      - ☒ 3BN7MAR
  - ☐ Brevity Code
  - ☐ Key Tracks
  - ☐ Missing Key Tracks
  - ☐ MTD
- C2PC Network Status

**LOD/Bnd**

LOD/Bnd	Start_Latitude	Start_Longitude	End
COA1.LD Green	33.34111111111111	-117.48111111111111	33.29805
COA1.LOA canary	33.3625	-117.3513888888889	33.33333
COA1.LD Purple	33.4675	-117.48583333333333	33.41944

Unit	LOD/Bnd	Time Of Departure
TF33	COA1.LD Purple	030246:27Z Aug 03
TF22	COA1.LD Green	
1BN7MAR	COA1.LOA canary	
3BN7MAR	COA1.LOA canary	
WPNS5MAR	COA1.LD Green	
1BN5MAR	COA1.LD Purple	

Unit Name: 1BN5MAR  
LOD/Bnd: COA1.LD Purple  
Enable Log: ☒

Buttons: Add LOD/Bnd, Clear All, OK, Apply

**Overlay Files & Segments**

- Overlay Files
  - COA1.mgc
    - LD Green
    - LOA canary
    - LD Purple
  - 10W5903P1.mgc
    - TacGraphicLine1
    - TacGraphicLine2
    - TacGraphicLine3
    - TacGraphicLine4

**LOD Alert! - 1BN7MAR**

**LOD Alert!**

1BN7MAR  
has crossed Line Of Departure:

LOA canary

Acknowledge

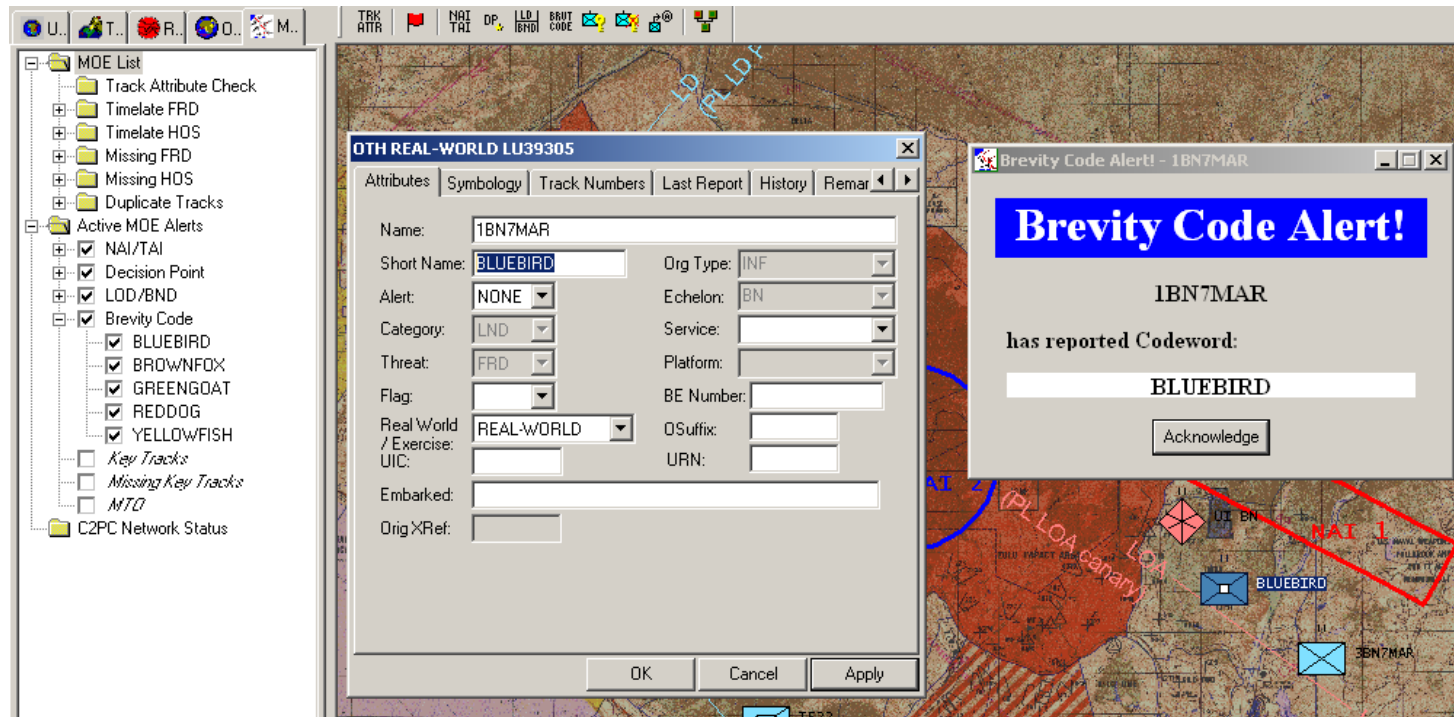
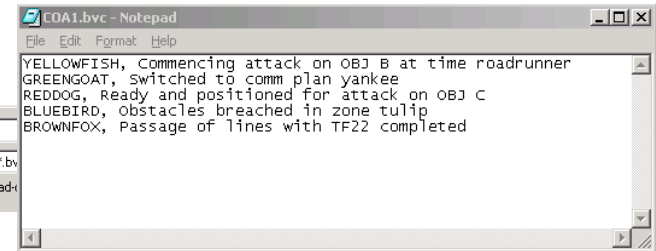
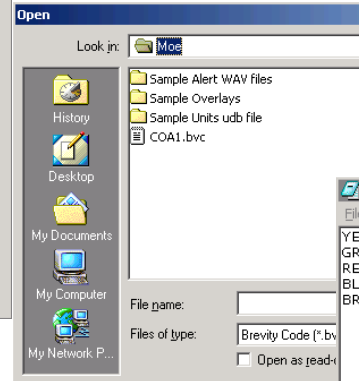
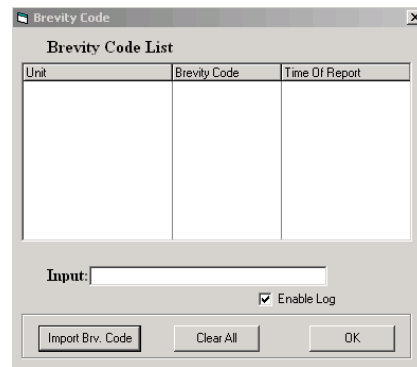
# Brevity Code Agent

Brevity Codes are imported from a file or entered in MOE. A unit reports the Brevity Code changing by his track's "Shortname" field to the Brevity Code which is automatically "broadcast" across entire MAGTF C2PC Network.

C2PC MOE monitors the active track database for Brevity Code reporting.

C2PC MOE pops-up an Alert window when a Brevity Code is detected.

The event is also recorded in the Brevity Code Log





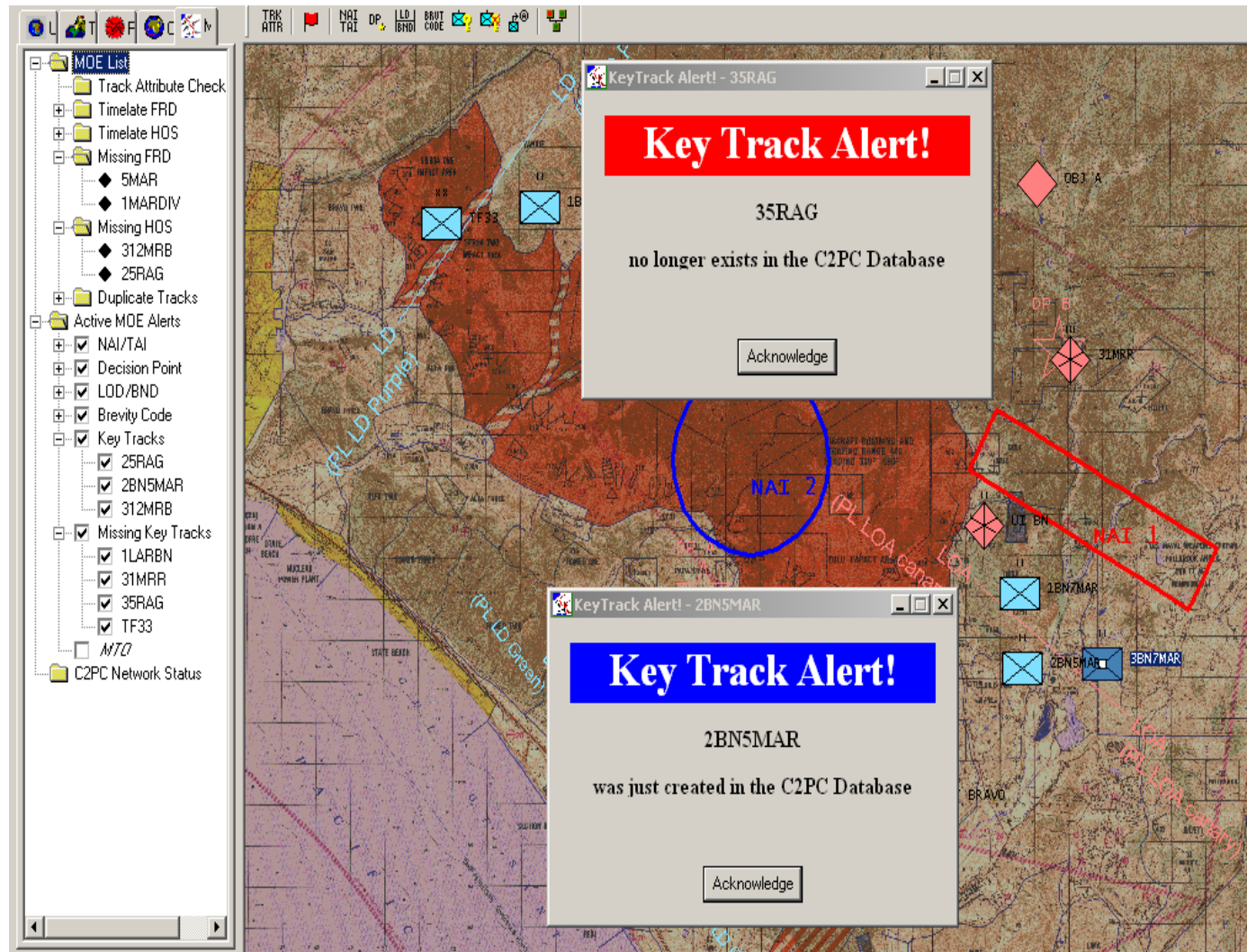
# Key Track/Missing Key Track Agent

Key Track names entered by a reporting unit in the “Name” field are “broadcasts” across entire MAGTF C2PC Network.

C2PC MOE monitors all C2PC unit tracks that are being created or deleted. If the tack name matches the Key Track or Missing Key Track list then an Alert is trigger – even if not in current map view.

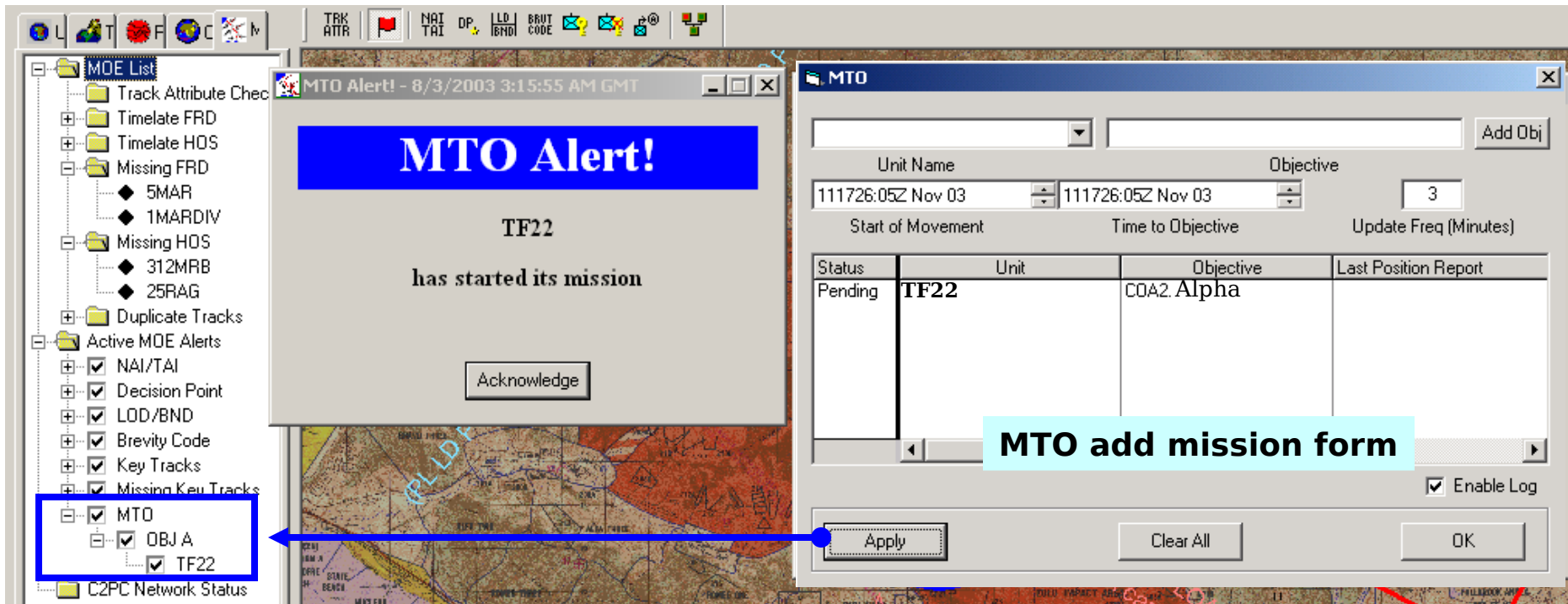
Key Tracks might be a HVT/HPT initial detection/reporting or the unit of main effort.

C2PC MOE records all Key Track alerts in the Key Track





# MTO Agent



MTO - Movement to Objective - is simple routine that the OPS O can use to monitor a MTO mission from start of movement to the objective (C2PC Objective Overlay).

MTO uses a simple “as the crow flies” algorithm to determine if the unit will make it to the objective at the specified time based on his rate of movement. MTO will also alert if the unit has not moved or moved further away in the specified reporting period.

If unit cannot make it to the objective on time the Commander may have to change his entire battle plan.



# Alert Logs (~AAR)

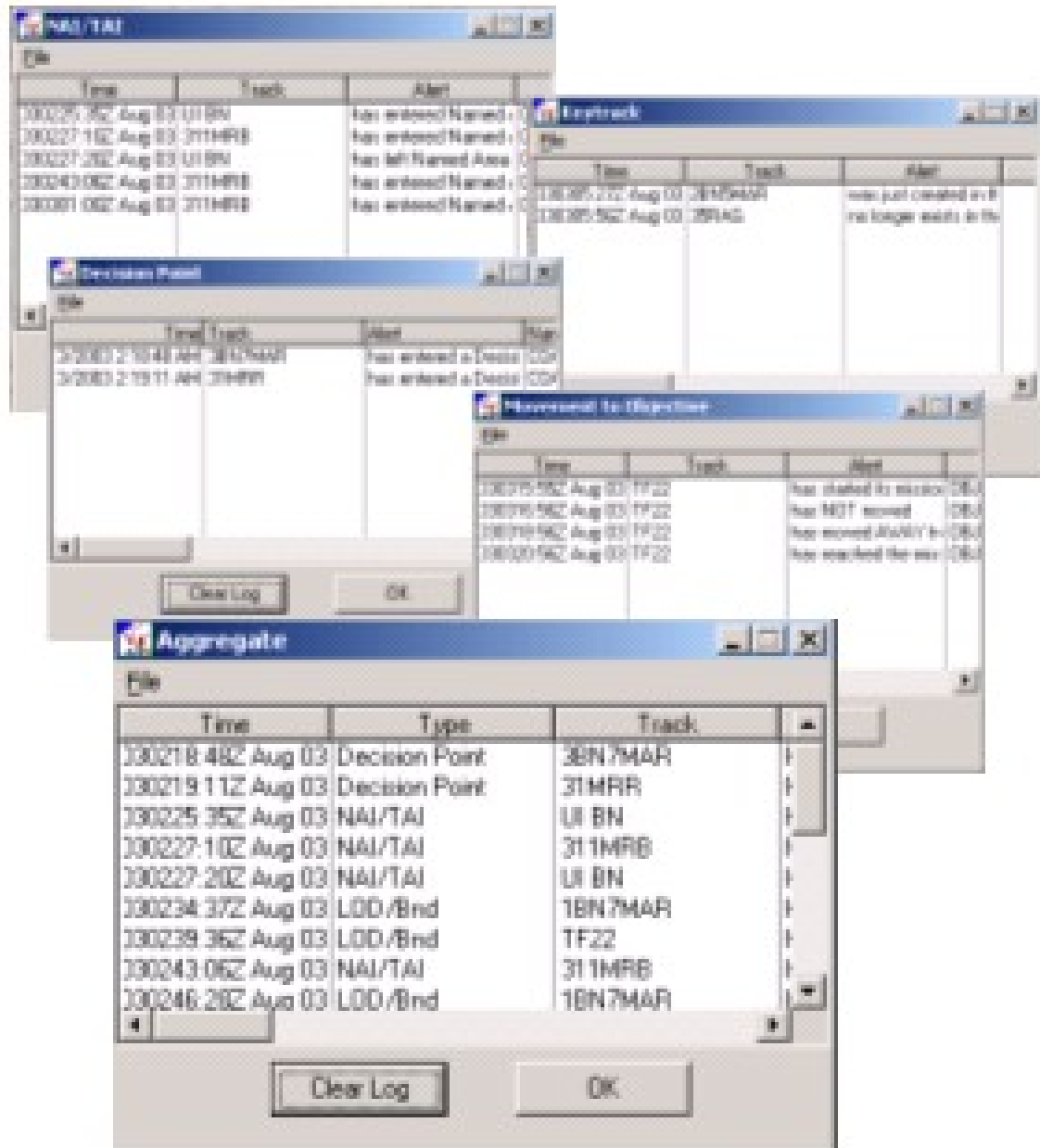
The Alert Logs, if enabled, record each event being alerted based on your MOE criteria. It can be a simple After Action Report of the critical events for the operation.

Each active overlay (DP, NAI, Brevity Code, Key Track, Missing Key Track, MTO, and LOD) has it's own log which can be enabled independently.

There is also an aggregate log.

The log is maintained in the MOE database and can be printed or saved as a “delimited” file so you can import into Excel and conduct refined analysis.

Alerts will be recorded, if enabled on the individual tabs, even when the alert pop-ups are deactivated.



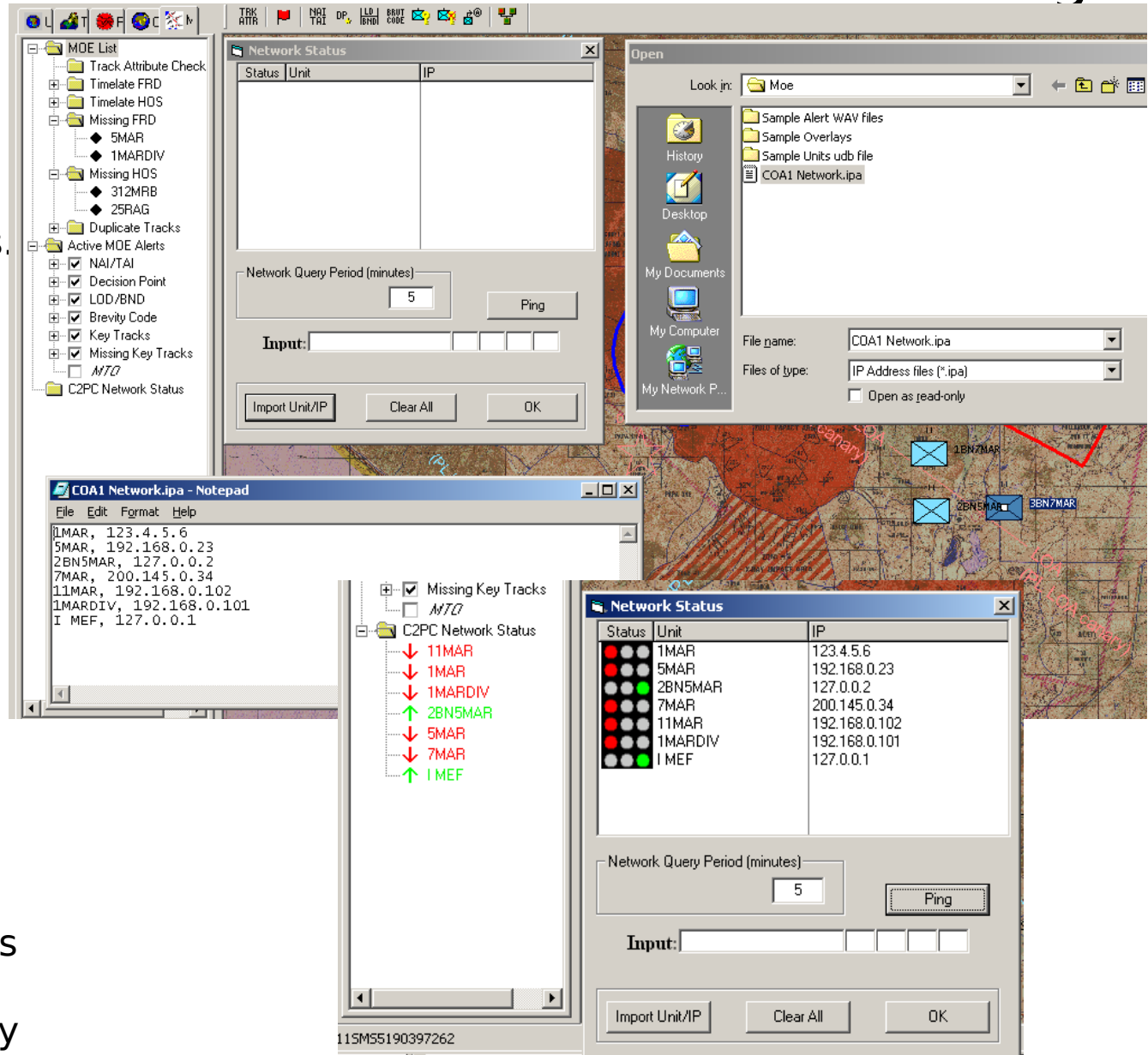
# Network Status Agent

The Network Status Agent is a simple ping utility that the Watch Officer/Chief uses to monitor the C2PC reporting units.

Use the “Network Status” form to import or enter the unit name and IP address of each C2PC in your CTP reporting architecture.

Set the Network query interval for auto ping.

The units are added to the network status folder in the C2PC panel to continuously monitor the status of your reporting units



# Planned for v2.1

- Upgrade to 6.0 APIs
- Combat Effectiveness attribute check
- Modify Key Track monitoring (create, delete, move)
- Modify Phase line alerts
- Timelate by attributes
- NAI alerts by attributes
- Branching DP alerts
- Hostile unit Danger Close range alerts for specific units

Submit your v2.2 requirements now!

# Questions

**Call or E-mail:**

**CB Brown at 1-800-299-8474 or email [cb.brown@titan.com](mailto:cb.brown@titan.com)**

**Stephen Barber at 1-888-278-1830 or email [stephen.barber@titan.com](mailto:stephen.barber@titan.com)**